PROCEDURE

Safe Lifting Operations

REVISION HISTORY

Revision No.	Issue Date	Amendment Description	Date Effective	Revalidated
00	14.12.2015	Newly Established	14.12.2015	13.12.2018
01	01.08.2019	Additional information adds on Definitions of Terms. Used of new template for establishing procedure.	01.08.2019	

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REVISION HISTORY

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1. Internal Controls

1.1REVIEW of PROCEDURES

To assure Managements, Shareholders and External agencies confidence in the company's policies & practices, QATAR STEEL Internal Audit may verify compliance with this procedure. [Department Owner] shall review this procedure every three years to ensure that it continues to serve the purpose intended.

1.2. EMPLOYEE RESPONSIBILITIES

All employees of the company are required to observe and abide with this procedure.

1.3. APPROVAL

This procedure and any amendments made thereto; require the following approvals.

AUTHORITY	DATE
Approved By: **Mohammed Nasser Al-Hajri** **Managing Director & Chief Executive Officer (MD/CEO)**	18/8/2019
Checked By: **Alexander Stramrood** **Manager – HSE Department**	25/07/2019
Drafted By: **Jacobus Theodorus Goosen** **Head of Section – Safety**	25/07/2019

This document has been reviewed by Document Controller. It complies with the requirements of policy 1.12.0.1.01.01 and it is considered ready for issue.

Signed by _____ **Date** 25.07.2019

2. Purpose

The purpose of this Qatar Steel Lifting procedure is to implement and verify the standard safe working practices to protect all individuals from the hazards of lifting activities.

3. Scope

This procedure applies to all employees, contractors, Sub-Contractors, at the Qatar Steel site who performs or is involved with lifting operations. Each contractor shall ensure that its employees follow this procedure.

This regulation specifies in details:

- The mandatory requirements and recommendations for the safe utilization of all lifting equipment operating in QS premises.
- The experience, qualification and training requirements for lifting equipment personnel, maintenance, inspection, testing, critical lift operation, organizational setup and quality systems for safe use of lifting equipment.

This regulation shall be:

- Considered as mandatory requirements applying to all departments and contractor owned and operated lifting equipment.
- Applied to use, purchase, operate, maintain and hire of lifting equipment, at any location within QS premises.
- Implemented by buyers, vendors, users, contractors and sub-contractors, and all QS operational depts. including projects, with clear identification of their responsibilities to prevent the use of any outdated and/or uncertified lifting equipment.

4. Procedures

Qatar Steel procedure is to provide and maintain safe working environment at all operational areas including projects with continuous improvement in utilizing lifting equipment.
The document defines the requirements that apply to lifting operations within Qatar Steel to protect personnel from injury and property from damage.

4.1 Definitions of Terms

Lifting Appliance: Lifting appliances are the mobile or stationary equipment used to lift loads. These are usually powered by mechanical, electrical, hydraulic or pneumatic mechanism. Ex: crane, winch, fork lift, man lifts etc.

Lifting Tackles: These are the aids required to suspend the load by the lifting appliance.
Ex: slings, hooks, eyebolts, baskets etc.

Colour Coding: QS operates a system whereby all lifting equipment is colour coded with a designated colour. The validity of the colour code is one month and colour coded according to the scheduled.

Competent person: A person approved by QS for the particular activity being described.

Contractor: An organization or entity providing products and/or services to QP.

Crane footprint: The area contained within 360 degrees of the lifting operation, covering the size of the load and 1.1 x maximum crane boom length.

Dynamic Factor: The load factor by which the capacity of a crane is determined for offshore and onshore applications.

Emergency Repair: For the purposes of this regulation, an emergency repair of lifting equipment shall only be considered an emergency in situations where the danger to personnel, assets or the environment would be greater if the repair is not carried out.
Under no circumstances will an emergency repair be carried out without prior notification and approval of the QS HSE Manager / and acceptance by STI, whose responsibility is to evaluate the situation based on the facts.

Factor of Safety (FOS), Coefficient of Utilization or Working Coefficient: It is a factor that is applied to the MBL to determine the WLL. It varies with the product to take account of the susceptibility to damage and considers the type of stresses the item will meet in normal use.

Inspection: Any physical activity, related to ensuring that an item of lifting equipment, in its entirety and at a given location or environment, meets the specified design and operating standards and is safe to operate or utilize for a specified period. This includes, but is not limited to, activities such as measuring, testing, and recording, checking, analyzing, loading and charting one or more characteristics of the equipment.

Lifting Appliances (Lifting Machines): Any manual or powered lifting machine, that is able to raise, lower or suspend loads, and includes the supporting structure and all plant, equipment and gear used in connection with such a machine, but excludes continuous mechanical handling devices (i.e. conveyors).

- Cranes (mobile, tower, pedestal, etc.),
- Wall/pillar cranes, derricks, swing jibs,
- Runway Beams, Monorails, Gin Poles and Gin Wheels,
- Manual and Powered Hoists and Winches,
- Chain blocks, Tirfors, pull lifts, trolleys,
- Powered Working Platforms,
- Elevators and Lifts,
- Forklifts, boom trucks, side booms and excavators,
- Lifting jacks (pneumatic or hydraulic).

Lifting equipment: A generic term used to cover both lifting gear and lifting machines. Lifting equipment shall mean any work equipment for lifting or lowering loads, and includes its attachments used for anchoring, fixing or supporting it. It includes any lifting accessories that attach the load to the lifting machine in addition to the equipment that carries out the actual lifting function.

Lifting Gear (Lifting Accessories or Loose Gear): Any item used to connect a load to the lifting appliance but which is not in itself a part of the load or the appliance, such as:

- Chains and Wire
- Chain Slings, Wire Rope Slings and Webbing Slings,
- Rings, Links, Hooks, Shackles, Eye Bolts, Swivels,
- Blocks, Snatch Blocks,
- Beam Clamps and Plate Clamps,
- Lifting Beams / Spreader Beams,
- Man-baskets.

Load: Means any material, personnel, or any combination of these that are lifted, lowered or suspended by the lifting equipment. The weight of the lifting accessories including the hook block shall be considered as part of the load being lifted.

Minimum Breaking (or Failure) Load (MBL): The minimum-breaking load is the calculated load at which a sample of the item will break or fail.

Mode Factor: A factor applied by the user that takes into account the geometry of a sling assembly to obtain the maximum load that may be lifted for a particular mode of use or a configuration of use.

Operational Facility: Any location containing QS assets or processing plants where any lifting operation can create an unsafe situation or a business risk.

Periodic Inspection: The minimum specified period between one inspection and a repeat or next inspection

Proof Load Test (PLT): Deliberate application of a predetermined load in excess of SWL to assess the ability of the equipment to withstand operational requirements. This applied proof load shall never exceed the elastic limit of the item being tested. The amount of proof load to be applied will vary depending upon the type of equipment, its SWL, and the applicable standard.

Repair: A measure whereby the original state of an appliance will be restored by rebuilding or exchanging parts or units. If essential parts with safety functions are to be rebuilt or exchanged, this is considered to be a major repair. This is the case particularly in respect of the exchange of the following:

- Brakes
- Safety gear or catching devices
- Over-speed governors
- Load carrying parts (e.g. anchorages, open or closed smelters sockets, primary structures etc.)
- Driving mechanisms and controls.

Safe Working Load (SWL): The maximum load, as certified, that an item of lifting equipment may raise, lower or suspend under particular service conditions. It is the SWL that is marked on the item and that appears on any examination report or test records. Standard document, established by consensus and approved, that provides, for common and repeated use, rules, conditions or requirements, recommended practices, procedures, guidelines, specifications, philosophies and datasheets, aimed at the achievement of the optimum degree of order in a given context.

Sub-contractor: An organisation or entity providing products and/or services to the contractor.

Supplier: An organisation or entity manufacturing and/or selling products and/or services to QP or to the contractor.

Third Party Certification: Any activity related to lifting equipment where it is necessary to obtain a certificate, signed by a qualified, independent body possessing the necessary competence, professionalism and expertise recognized by governments and international institutions worldwide in both legislative or non-legislative environments, having professional liability and indemnity or insurance issued for the purpose of certification.

Third Party Certifying Authorities (TPCA): An internationally recognised independent, inspection and certification body approved by QP Corporate HSE to:

- Inspect, test and certify all lifting equipment,
- Train and certify lifting equipment personnel.

Training: The training of personnel involved in lifting operations such as crane operator, rigging supervisor, forklift operator, rigger, etc. provided by approved TPCAs.

Witness: The visual inspection and appraisal by personnel of an approved TPCA, complying with the requirements of this regulation, of any operation or task relating to any item of lifting equipment to ensure compliance in accordance with the relevant standard requirements and to confirm and validate the results.

Working Load Limit (WLL): The maximum load (as certified based on the design and mechanical properties of the item) that an item of lifting equipment is designed to sustain, i.e. to raise, lower or suspend incorporating an appropriate FOS.

4.1.1 Abbreviations:

CAR - Corrective Action Requests
Dept. (s) - Department(s)
FOS - Factor of Safety
GW - Gross weight
HSE - Health, Safety and Environment
ID - Identification
LEEA - Lifting Equipment Engineer Association
LOLER - Lifting Operations and Lifting Equipment Regulations
MBL - Minimum braking (or failure) load
MPI - Magnetic particle inspection
NDT – Non-destructive testing
OEM - Original equipment manufacturer
PCSA - Power Crane and Shovel Association
PLT - Proof load test
QMS - Quality management system
QP - Qatar Petroleum
QS- Qatar Steel
(A)SLI - (Automatic) Safe Load Indicator
STD - Standard
SWL - Safe working load
TPCA - Third Party Certification Authority
WLL - Working Load Limit
EOT- Electric Overhead Travelling

4.2 Responsibilities

- It is the responsibility of the concerned QS Dept. (s), and the contractor to ensure that this regulation and relevant standards detailed below are available. Furthermore, it is the responsibility of the respective operations management to ensure that the lifting equipment personnel are aware of the requirements of the standards and any amendments that may be issued from time to time.

- This regulation is aimed to achieve a high level of quality and safety awareness in all lifting operations performed within the jurisdiction of QS and contractors.

- It is the mandatory requirement of this regulation that no item of lifting equipment shall be utilized to raise, lower, suspend or transport a load, unless a valid certificate verifying suitability for its intended use has been issued by an approved TPCA on six monthly basis.

- Any item of lifting equipment, not holding a valid certificate from any approved TPCA, shall not be utilized in any QS operational area. Original or approved copy of valid certificate shall be available at the site where lifting equipment is in use.

- Any certificate issued by private companies or TPCAs who are not approved, shall not be accepted unless it is endorsed and supported by a valid certificate issued by an approved TPCA.

4.3 Proposed Third Party Certification Authority (TPCA)

The following lists are as follows:

- Applus Velosi
- TUV SUD
- Bureau Veritas

4.4 General requirements for QS/Contractor Lifting Equipment Personnel

4.4.1 Qatar Steel / Contractor Rigging Supervisor

- **Physical and Educational Qualifications**

All QS/Contractor rigging supervisors shall:

- Be at least 35 years of age.
- Physically fit with regard to eyesight, hearing, reflexes and ability to handle lifting gear and equipment.
- A minimum of 10 years rigging experience in the steel manufacturing, oil and gas industry, with at least three years supervisory experience.
- Have had adequate training and experience and be competent to act as an appointed person or focal point nominated by management to be in overall control of the lifting operations.
- Be capable of reading, speaking, writing and understanding the English language.
- Have strong administrative and supervisory skills to schedule, monitor and control the lifting equipment personnel and lifting operations.

- **Training and Certification Requirements**

- Must hold valid certification in rigging and rigging supervision issued by an approved TPCA.
- All certified and authorized QS/contractor rigging supervisors shall hold a laminated identification card with photograph issued by an approved TPCA.

- **Responsibilities and Duties**

- Organization and control of the lifting operation.
- Assessment of the lifting operation to provide such planning, selection of cranes, lifting gear and equipment, instruction and supervision as is necessary for the task to be undertaken safely.
- Ensure that accurate weights, radii, heights etc. are established.
- Ensure that the ground is made suitable for taking up the loads to be imposed.
- Ensure that suitable access is provided to the site and any area required for erection and dismantling the crane.
- All hazards such as services (gas, water, electricity etc.) above or below ground are identified and suitable precautions are taken.
- Ensure that adequate inspection and maintenance of the equipment has been carried out.
- Ensure that there is an effective procedure for reporting defects and incidents and taking any necessary corrective action.

- Ensure that both the rigger and the crane operator are familiar with the method of signaling to be used.

4.4.2 Crane Operator

➢ **Physical and Educational Qualifications**

- Be at least 25 years of age,
- Be educated to a minimum secondary level,
- A minimum of five years' experience,
- Be capable of reading, speaking, writing and understanding the English language sufficient for the safe operation of the crane,
- Be physically and medically fit, especially with regard to eyesight, hearing and reflexes.

➢ **Training and Certification Requirements**

- All mobile cranes shall be driven or operated by a person holding a valid Qatar driving license (Grade 4) or as authorized for mobile crane in the new Qatari driving license or equivalent valid GCC driving license.
- All cranes shall be operated by a person holding a valid certificate of competence issued by an approved TPCA.
- All certified and authorized crane operators shall hold a laminated identification card with photograph issued by an approved TPCA
- All certified and authorized crane operators shall only use equipment for which they have received training and to use it in the manner in which they have been trained.
- Minimum training, three days for fresh hands and two days for the refreshers.
- QS may demand the removal of the Operator where incompetence or negligence is proven at any time during an operation.

➢ **Responsibilities and Duties**

- Correct operation of the crane as per manufacturer's instructions. The crane operator shall ensure that the crane is roadworthy, functioning correctly and is properly maintained each and every time that the crane is operated.
- Setting the crane level prior to lifting and checking that it remains level throughout the operation.
- Establishing which signaling system is to be used and following instructions from only one signaler at a time.
- Stopping operations if given any instructions that would take the crane outside its permitted duties.
- Stopping operations if the signaler is not within his direct sight.
- Stopping operations if visibility is not clear.

- Informing the supervisor of any problems that arise which would affect the lifting operation.
- Recording the daily checks, maintenance and comments relating to the crane's operation in the log book for the crane.
- The crane operator shall know the weight of the load prior to start of lift. No load is to be lifted where the weight is unknown.
- Shall not leave the crane unattended while a load is suspended from the hook.
- Where lifting operations involve the use of lifting equipment in proximity to overhead power lines, it is the responsibility of the crane operator to ensure that it is safe to do so. The crane operator shall ensure that the equipment is operated in such a manner that no item of lifting equipment is within 20 meters proximity of any live overhead power line.
- Put the operation on halt if riggers are not present or are exposed to any potential hazard.
- It is forbidden to use mobile phone inside the crane cabin.

4.4.3 EOT Crane Operators

- Only trained, competent and properly authorized Operators are permitted to operate EOT.
- Crane Operators must be physically fit and have good hearing and eyesight. They shall undergo periodic medical checking once in year.
- The crane operator should have minimum five years of experience in operation of crane and must be deployed after selection and getting crane operator card by crane operator selection committee.
- Before taking charge of the crane, operator must fill the daily shift checklist and communicate immediately if any abnormality observed.
- A crane operator shall be alert at all times.
- He shall familiarize himself fully with all crane safety operating instructions, the crane mechanism and its proper care as per manufacturer's manual.
- He shall not operate a crane, when in his opinion, is unsafe.
- He shall at all times ensure that the crane is properly lubricated in accordance with instructions issued.
- He shall not leave his control position while a load is suspended from the crane.
- Where and when crane fails to correctly respond to controls, the crane **operator** shall immediately stop the operation and immediately informed to QS competent person.
- He shall immediately report to his supervisor any unusual operating feature, noise or undue wear that may be noted and crane shall not be used until such conditions are examined and rectified.
- In case of power failure, the crane operator shall move all controllers to **OFF** Position and report the matter to QS competent person and wait for further instructions.
- He shall not by pass limit switches.

- The crane operators shall not tamper with circuit breakers, limit switches and or other safety devices.
- The rigger should have knowledge of slinging and give correct instructions of load. He should use only slings, which are free from defects, inspected and tested in stipulated manner.
- Before leaving the crane, the crane operator should ensure the crane is in designated location and there is no suspended load from the hook and hook is cleared of all obstructions. The power should be switched off.
- Crane monthly inspection checklist must be followed.
- Before starting work, the ground staff should acquaint the crane operator with the sequence of work.
- While making any crane movement, only one man (rigger) is to give signal
- Before giving signal for lifting or traveling of the load, the reliability and correctness of the fastenings shall be checked
- Correct size of sling and good quality sling should be used while lifting loads
- Signal should be given from the place visible to the crane operator standing near the lifted load
- Crane Operator should give audio signal (bell/ horn) while making movement of load
- Avoid working / walking below/ around the suspended loads.
- Checking for any abnormal sound from track LT & CT gear boxes, wheel assemblies, etc. whenever crane is started or during the course of running
- Never make oblique pulls and never throw hook blocks of cranes out of its reach by swinging
- Crane Operator should never give sudden reversal power for stopping the crane. Stop smoothly.
- Never hit the lifted load on any structure or building
- It is forbidden to sleep inside the crane.
- While parking, main switch should be switched off and all controls should be kept in neutral.
- Nobody should make an attempt to either using lifted load as a intermediate platform or standing on the load.
- It is forbidden to use mobile phone inside the crane cabin.

4.4.4 Rigger

- **Physical and Education Qualifications**

All Riggers shall be:

- Minimum 21 years of age.
- Educated to a minimum secondary level.
- A minimum of three years' experience.

- Capable of reading, speaking, writing and understanding the English language sufficient for the fulfillment of their function in a safe manner.
- Physically fit with regard to eyesight, hearing, reflexes and ability to handle lifting gear and equipment.

➢ **Training and Certification Requirements**

- All riggers utilized in QS operational area shall hold a valid certificate of competence issued by an approved TPCA or an internationally recognised body acceptable by TPCA.
- All certified and authorized riggers shall hold a laminated identification card with photograph issued by an approved TPCA.
- Certificates of competency issued without evidence of appropriate training shall be liable to rejection by QS. The validity of the certificates shall not in any case exceed three years.
- All riggers involved in lifting operation shall have a valid riggers certificate of competence.
- QS may demand the removal of a rigger where incompetence or negligence is proven at any time during an operation.
- The duration of the training course shall be minimum three days training for fresh candidates and two days training for refresher.

➢ **Responsibilities and Duties**

It is the rigger‘s responsibility to ensure that the lifting tackle is functioning correctly and is safe to use, properly maintained, and all maintenance activities are registered and documented. This does not in any way alleviate the responsibility of the management or owners of the lifting tackle, in ensuring that the lifting tackle meets the requirements of this regulation and the appropriate standards. All riggers shall:

- Ensure that both the rigger and crane operator is familiar with the method of signaling to be used.
- Ensure that no load is to be lifted where the weight is not stated or unknown,
- Check that the lifting equipment being used is in good condition, certified for use, correctly color coded, and of sufficient capacity to carry out the lift.
- Ensure taglines are always attached to loads that are likely to swing.
- Be aware of any obstructions within the crane radius and working area,
- Check that the area around the load to be lifted is clear and that the load is not attached to the floor, transportation cradle or adjacent equipment,
- Ensure that crane hook is position in the above center of each load before sending any signal to the crane operator,
- Ensure that no personnel standing between two loads, especially if one load will be lifted and repositioned,
- Ensure that escape route is identified,

- Check that no personnel are below the load whilst lifting is in progress,
- Ensure all hands are free of lifting tackle and stand clear before the load strain is taken,
- Clearly indicate to the crane operator where the load has to be moved to or placed and, where possible, he shall follow each load to its destination,
- Warn other personnel in the area of the movement of the load,
- Observe and note other activities within the crane‘s operating area to avoid the development of any unforeseen hazards,
- When lifting a load, stop hoisting when load reach 10 cm. above the ground to check security and balance of the load, and check the proper function of the crane‘s hoist brakes,
- Stop the lifting operation if anything out of the ordinary occurs and check that it is safe to continue the operation,
- Solely direct the lifting and loading activities and operations.

4.4.5 Forklift Operator

- **Physical and Education Qualifications**

  - Minimum 21 years of age.
  - Be capable of reading, speaking, writing and understanding the English language sufficient for the fulfillment of their function in a safe manner.
  - Physically fit with regard to eyesight, hearing, reflexes and ability to handle lifting gear and equipment.

- **Training and Certification Requirements**

  - All forklift operators shall have a valid Qatari driving license, grade 2 up to six tonnes and grade 4 for above six tones.
  - All forklift operators shall hold a valid certificate of competence issued by an approved TPCA.
  - All certified and authorized forklift operators shall hold a laminated identification card with photograph issued by an approved TPCA.
  - All certified and authorized forklift operators shall only use equipment for which they have received training and to use it in the manner in which they have been trained,
  - The duration of the training course shall be a minimum of three days for fresh candidates and two days for refresher,
  - The validity of the certificates shall not exceed three years.

- **Responsibilities and Duties**

  - Forklift operators shall be responsible for ensuring that the forklift is functioning correctly and properly maintained each and every time the forklift is operated.

- Stop the lifting operation if anything out of the ordinary occurs and check that it is safe to continue operation.
- When lifting a load, raise 10 cm stop the load just clear of the ground, to check security and balance of the load, and check the function of the lifting brakes.
- Observe and note other activities within the load operating area to avoid the development of any unforeseen hazards.
- Warn other personnel in the area of the movement of the load.
- Check that the area around the load to be lifted is clear and that the load is not attached to transportation cradle or adjacent equipment.
- Be familiar with the lifting capabilities of the forklift.
- Check that the forklift being used is in good condition and certified for use.
- Ensure that no load is to be lifted where the weight is not stated or unknown.
- Ensure that all equipment controls function correctly.
- Ensure that the load does not block the vision of forklift operation. If unavoidable, safety-watch to be provided during period of load lifts and transfers.
- Ensure that the light around the forklift and rotating siren are functioning correctly.

4.4.6 Man-Lift Operator

This section shall cover all operators of man-lifting appliances including but not limited to man-lifting platforms, mobile elevating work platforms, cherry pickers, boom lift, scissor lifts, etc.

- **Physical and Education Qualifications**

  - Minimum 21 years of age.
  - Be educated to a minimum secondary level,
  - Be capable of reading, speaking, writing and understanding the English language sufficient for the fulfillment of their function in a safe manner.
  - Physically fit with regard to eyesight, hearing, reflexes and ability to handle lifting gear and equipment.

- **Training and Certification Requirements**

  - For all man-lift appliances that require operators to drive them, the operators have a valid Qatari driving license, grade 2 or as authorised for a car in the Qatari driving license.
  - All man-lift operators shall hold a valid certificate of training issued by the equipment manufacture or an approved TPCA
  - All certified and authorized man lift operators shall hold a laminated identification with photograph issued by an approved TPCA
  - All certified and authorized operators shall only use equipment for which they received training and to use it in the manner in which they have been trained.

- **Responsibilities and Duties**

Man-lift operators shall be responsible for ensuring that the man-lift is functioning correctly, and properly maintained, and checked against an approved checklist each and every time the man-lift is operated.

- Stop the lifting operation if anything out of the ordinary occurs and check that it is safe to continue operation.
- Observe and note other activities within the operating area to avoid the development of any unforeseen hazards.
- Warn other personnel in the area of the lifting operation.
- Check that the area is clear for operation.
- Be familiar with the lifting capabilities of the man-lift.
- Check that the man-lift being used is in good condition and certified for use.
- Ensure that all equipment controls function correctly.

4.5 Lifting Appliances

- All lifting appliances shall be designed, engineered, constructed, installed, tested, operated and maintained in accordance with the specified standards.
- No lifting appliances shall be used unless an approved TPCA has issued a certificate, verifying its design suitability for its intended use in a specified environment.
- All lifting appliances shall be assigned unique identification numbers and marked with certified SWL. In addition all items shall be color coded in accordance with QS color coding scheme, which is applicable at the time of utilization. The contractor shall ensure that the equipment bears the current color coding according to the period specified in the QS color coding schedule.
- A comprehensive register of lifting equipment detailing the following minimum information shall be developed for monitoring periodic inspection requirements.
- Maintenance supervisor will be the focal point when equipment arrives on site. He may nominate other personnel for this job.
- No lifting appliance shall undergo alterations to components or parts that affect its structural integrity or load bearing capacity without the written approval of an approved TPCA or from the original equipment manufacturer.
- When lifting appliance has undergone repairs that affect the load bearing parts or replacement of parts or components that affect the structural integrity, the lifting appliance shall be re-inspected and certified by an approved TPCA.
- Safety devices that affect the integrity of a lifting appliance shall not be altered without the written approval of an approved TPCA or the original equipment manufacturers.
- Where a lifting appliance has suffered major damage or incident, the appliance shall not be repaired without a written repair procedure from the original equipment

manufacturer, and shall be retested after the repairs by an approved TPCA to verify the equipment structural integrity.

- Any lifting appliance, that has been newly installed or relocated, shall undergo approval by TPCA and commissioning tests shall be performed before being used.
- A complete manufacturer‘s maintenance and operating manual for lifting appliance shall be available for reference to the operator and maintenance personnel at site/location. The lifting appliance shall be operated and maintained in accordance with the procedures set out in their relevant handbook and manuals.
- Maintenance activities carried out on the appliance shall be recorded in the log book.

4.6 Requirements for Cranes

4.6.1 General

All cranes shall have the following:

- A hoisting limit device that, when actuated, stops the hoisting motion and applies the brake on the hoisting winch automatically.
- A luffing limit device that, when actuated, stops the luffing motion and applies the brake on the luffing winch automatically, and that is so arranged as to prevent bypassing of this device in the normal operation of the crane.
- Operating levers and switches that are clearly identified and marked. All markings shall be in English or internationally agreed symbols.
- Engine stop systems that operate in a manner such that the engine comes to rest with minimum delay.
- Check valves shall be fitted to all hydraulic cylinders to prevent cylinder movement in the event of hose failure.
- A facility for emergency lowering of loads.
- Temperature sensing devices, audio or visual type, or equivalent safeguards to give adequate protection to the prime mover and associated equipment.
- An emergency stop with manual re-set capability within crane operator reach.
- Motion control levers that return to neutral with a minimum delay upon release – this does not apply to engine throttle lever.
- Adequate fire extinguishers of a QS Fire section approved size and type.
- All pneumatic, hydraulic and electrical connections clearly tagged/marked, corresponding to the markings on the crane circuit drawings.
- An emergency escape route for personnel.
- Safety latches that automatically close fitted to all integral crane hooks.
- A suitable operating cab that adequately protects the crane operator and controls from the elements (weather), is adequately cooled (if possible) and ventilated, and provides a clear and unrestricted view of all operations associated with the crane.
- The SWL of the hook block prominently marked and highlighted on the hook.

- Where the design of the crane is intended for SWL loads of greater than five tonnes, a calibrated automatic SWL Indicator shall be fitted and a legible metric crane capacity chart prominently displayed.
- Outriggers and hooks clearly marked with a red and white chevron pattern.
- Crane hooks (for mobile cranes) secured to ensure no swinging occurs in transit.
- Maintenance and repair logbook for each crane is to be maintained.
- Audible and visual alarms to be installed in all cranes, which shall sound continuously when the crane slewing is set on.
- No crane shall be utilized for any operation other than that for which it was designed.
- Audible and visual alarm fitted on crawler cranes while travelling forward or reversing.

4.6.2 Special Restrictions

- No person shall be transported by a crane except in an approved workbasket or personnel transfer net. The operator shall not leave the controls while the personnel or load is suspended.
- All cranes utilized at jetties for handling loads shall have a legible metric load chart that has been calculated in accordance with the dynamic factor (load factor) or as recommended by the crane manufacturer, permanently fixed in the crane operator‘s cabin.
- When a crane is being operated, hand signal communication between the rigger and the crane operator shall be conducted in accordance with the standard hand signal requirements, except that voice communication, by radio or telephone between those persons, is permitted as an alternative.
- No crane shall be used beyond its statutory test period.
- Cranes shall not be used to transport loads unless they are specifically designed for the purpose.
- No crane is allowed to lift any weights above the SWL marked up as per the capacity chart.
- No crane is allowed to pull or tow/drag weights. No crane is allowed to enter any hazardous zone without permission and verification of zone requirement.
- Cranes shall not be utilized when the wind speed is more than 25 knots or where due to the nature of the load it becomes unmanageable due to wind acting on the load.
- Cranes shall not be utilized to carry out any lifting operations after sunset. Any lifting operations that have to be carried out after sunset or during periods of poor visibility, shall be with the full approval of the QS operational area management and department safety representative. The operational area shall be adequately illuminated to ensure all involved persons and equipment are clearly visible when carrying out the lift. In addition the lifting equipment shall have its own means of illumination to ensure that the operator at all times can see adequately what actions are taking place and the crane itself shall be fitted with lights at all extremities and along the length of the

boom where feasible to assist all personnel involved in the operation can be aware of any movement of the crane.

- Ground condition shall be assessed before deploying the crane outriggers. Crane pads shall be used to help disperse weight evenly under each of the cranes outriggers
- Cranes not in regular use shall be subjected to special checks as per the manufacturer's instructions/applicable standard, prior to being used.

4.6.3 Safety in the use of EOT Cranes

- EOT cranes work overhead. They are used for handling and transporting loads /materials in fabrication shop, operating area, machine shop etc.,
- Cranes working overhead is a safety hazard if it is not operated and maintained, properly. Some of the safety rules are:
- All cranes shall be identified by position indicating the load which the crane is authorized to move, Identification number, SWL, date of manufacturing, last date of examination, next date of examination due
- No crane shall be used to move a load greater than that for which it is designed.
- No crane shall be used to move a load in any manner other than that provided for its design i.e. no crane shall be used for dragging or pulling a load.
- Where more than one crane is erected on the same premises, each shall be clearly marked for ready identification from floor level with a distinguishing number to be provided.
- Where and when cranes are required to move loads where workmen and other persons may cross the line of crane movement, an effective warning device shall be provided and securely fastened in a location convenient at all times to the crane Operator's control position
- Cranes shall be at all times kept clean.
- All operating signals given shall be in accordance with the requirements set out under operating signals.
- Extreme care shall at all times be exercised by crane Operators and attendants and all other personnel working or present on premises where cranes are located, to avoid contact with crane connector and/or any other power cables, whether covered or bare.
- Cranes shall not be used to tow/drag rail trucks or cars or other transport vehicles.
- Inspection and Maintenance of cranes shall be carried out at regular intervals as per checklist and properly documented.
- All overhead travelling cranes shall comply with the requirements of the specified standards, and in addition shall:

  - Have a limit switch installed for over-hoisting motion of the hook.
  - Have limit switches/positive end stops with resilient buffers installed for cross travel and long travel movement.
  - Have anti-collision switches installed if more than one crane is operating on same gantry.

- Have lockable breaker switch at easily accessible position.
- Have audible warning device fitted for cabin-operated cranes.
- Have an overload limit switch system installed.
- Have prominent marking of SWL and ID number on the crane bridge
- Be thoroughly inspected by an approved TPCA at the intervals specified
- Not to be used beyond its statutory test period.
- Maintain records of maintenance and periodic safety checks.
- Be 100% SWL tested annually and witnessed by TPCA to verify the condition of brakes and controls of the crane. This is to be highlighted and clearly legible in the certificate.

NOTE: All QS owned overhead travelling cranes or similar type of cranes in various QS operational sites shall only be operated by approved personnel.

4.6.4 Safety precautions for Magnetic Lifting Device

- When the magnet is switched "ON" wait for 4 sec before trying to lift the billets and rebar bundles to allow the current in the magnet to build up.
- Movement of the crane (CT & CT) should be smooth without any jerks to avoid dropping of lifted billets and bundles
- Billets & Bundles should never be allowed for inspection, when they are above the ground and are held by magnets. During inspection, billets and bundles should rest on the ground even if magnet is holding
- Always make sure the magnet has been lowered on to the load and the lifting chains are slack before the magnet is switched 'ON'. This is the way to ensure maximum lift.
- Never switch 'ON' the magnet before it is lowered on the load
- Never lower the magnet quickly and suddenly on the load
- In case of power failure, a hooter gets switched "ON' and the magnets get energized by the battery backup. All other operations stop. In such a case, tell the rigger down below, that the loads are held by battery and ensure no one is below or surrounding area under the lifted load. The load will drop off after approx. 10 min. Tell mechanical persons, to loosen the main hoist brake so that the main hoist lowers down till touches the ground.

4.6.5 Safe Practices in Using Mobile Cranes

- Executing division shall ensure that riggers and crane operators are qualified, certified and competent for the task. Crane operator shall have valid equipment operations license and TPCA certificate.
- Drop area shall be barricaded using tapes or other means in areas where operation or maintenance activities are in progress.
- Outriggers shall be fully extended.

- The designated rigger shall give signals for crane operations. He shall wear a florescent jacket and red helmet for easy visibility.
- Load chart shall be available in the crane operator's cabin.
- Next due date for inspection shall be painted/tagged on the crane.
- Guide rope (tag lines) shall be used to control swinging.
- Communication equipment (Radios) shall be used when the rigger cannot give clear signals to the operator due to obstructions, height, or distance and when the crane operator can't see the load.
- Night parking within unit areas shall not be allowed. If required, it shall not block hydrants or any other access and 15m away from running units with joint approval of Operations supervisor and the Safety Engineer.
- Critical lifting operations must be planned with extreme care and written procedure shall be prepared.
- No one shall stand under the suspended load.
- Load shall not be left suspended and unattended. Crane operator or the rigger shall not leave the area without substitute.
- Fly jib shall not be used unless it is certified. Moving along the road with fly jib shall be minimized and with prior approval of area Safety Engineer.
- Multiple crane lifting operations must be planned with extreme care and written procedure shall be prepared for each lifting. Wire ropes shall remain vertical. Each crane shall be assumed to have 25% less than the rated SWL (Safe Working Load).
- No passengers are allowed to ride on the body of the crane.

4.6.6 Additional Requirements for Cranes Used For Lifting Persons in Suspended Man-Baskets.

- The crane shall have a factor of safety of 10:1 on crane capacity for each personnel lifting operation.
- The crane shall automatically stop all motions when the controls are released.
- The crane shall be equipped with wind speed meter.
- The crane control shall be such that the man-basket can move gently and the working speed shall not exceed 0.5 m/s on all motions.
- The crane shall have a control mechanism to lower the man basket to a safe position, in a controlled manner, in the event of power failure or crane's control failure. The operator shall be familiar with this control mechanism.
- The wire rope used for hoisting and lowering the man-basket shall have a diameter 12 mm and above.
- Guide rope (tag lines) shall be used to control swinging.

4.6.7 Lorry Loader Crane

- Shall not be used beyond its statutory test period.

- Shall not lift any weights above the marked SWL defined in the capacity chart.
- Shall not pull or tow weights.
- Shall not enter any dangerous zone without permission and verification of zone requirement.
- Never move the vehicle with the outrigger in extended position.
- Never move the vehicle with the boom in extended or raised position.
- Never move the vehicle with the load on the crane (pick and carry is not allowed).
- Shall not be operated on tyres without extending the outriggers.
- Lorry loader crane (telescopic boom with/without winch system) above five tonnes capacity shall be fitted with either automatic safe load indicator or a device that shows the percentage of the actual loads.
- Petrol and LPG-engine lorry loaders shall not be used in areas where there is a risk of a flammable vapour, gas or dust concentration being present.
- All lorry loader cranes shall be thoroughly inspected every six months.
- Diesel-powered lorry loader trucks shall only be used in potentially explosive atmospheres if, in addition to protection of the electrical system, the exhaust is protected against spark emission, precautions are taken against the intake of flammable mixtures and hot surfaces are protected.
- All lorry loader operations shall be halted where weather conditions are bad enough to adversely affect the performance of the lift truck or expose the operator to danger, e.g. excessive wind speed, poor visibility due to mist or fog, lightning or heavy rain.
- An adequate and certified portable fire extinguisher shall be provided within the crane operator reach.
- Lorry loader can only be operated by a person with a valid Qatari driving license

4.7 Handling of Billets

- Before transferring the Billets through EOT crane, ensure that no person is working / moving around the lifting activities.
- The Billets should be stacked in stable condition.
- No bend or curved slab to be kept on the pile.
- EOT Crane to be checked in every shift to avoid slippage of Billets.
- Big size Billets should not be stored above the small size of Billets.
- While handling hot slab, no person should be allowed to stand near the Billets.
- Billets should be kept in such a way that there should not be any obstruction on Walkway.
- Communication system between crane operators to be provided for safe handling of Billets.

4.8 Forklift

All forklifts including electrically/battery operated shall comply with the requirements of the specified standards and the manufacturers operation and maintenance manuals, and additionally:

- Forklifts shall be fitted with Qatar traffic registered number plate.
- Forklifts shall not be driven on public roads.
- Fork arms shall not be distorted or perforated.
- Forklifts shall not be used to lift a load greater than the maximum designed SWL.
- Forklifts shall not be used to lift loads unless the pneumatic tyres are inflated to the correct pressure.
- The inflation pressure for each tyre shall be shown prominently on the lift truck.
- All lift trucks shall be fitted with audible warning devices such as horn and reverse horn to warn other personnel in the vicinity.
- Forklifts shall be provided with suitable lights at the front and rear if the lift truck has to be driven at night or in areas with insufficient natural or artificial light. Consideration shall be given to fitting a flashing yellow light on the top of the lift truck.
- All lift truck operations shall be halted where weather conditions are bad enough to adversely affect the performance of the lift truck or expose the operator to danger, e.g. excessive wind speed, poor visibility due to mist or fog, lightning or heavy rain.
- Petrol and LPG-engine lift trucks shall not be used in areas where there is a risk of a flammable vapor, gas or dust concentration being present.
- Battery-powered lift trucks shall only be used where there is a risk of a flammable
- Vapor, gas or dust concentration being present if they have been suitably protected. Diesel-powered lift trucks shall only be used in potentially explosive atmospheres if, in addition to protection of the electrical system, the exhaust is protected against spark emission, precautions are taken against the intake of flammable mixtures and hot surfaces are protected.
- If an attachment fitted may alter the characteristics of the lift truck, an approved TPCA, in consultation with the supplier or manufacturer, shall carry out necessary de-rating.
- The attachments shall be securely fastened and care taken to ensure that the attachments or securing device do not foul any part of the mast structure during raising or lowering of the attachment.
- All forklifts shall be thoroughly inspected by an approved TPCA at a maximum interval of six months.
- The SWL shall be prominently displayed on all forklifts.
- No forklift shall be used beyond its statutory test period.
- Use of forklifts for transport of personnel is strictly forbidden.
- All forklifts shall be annually tested to 100% SWL for offshore and onshore.
- All forklifts shall be fitted with adequate and certified portable fire extinguisher.

- All forklift shall be fitted with light around the forklift and rotating siren.

4.9 Lifting Grabs

Grabs shall be complied with the following requirements;

- Wire rope installed in the grab shall be replaced within 500 working hours in regardless of the condition of the wire rope.
- Pad eyes attached to the grab shall be PLT at an interval of every four years.
- A logbook shall be provided and available for the monitoring of the grab‘s working hours.
- All grabs shall be inspected and tested.

4.10 Man Lift / Working Platform / Scissor Lift

- Man lift operation shall not be carried out with wind speeds in excess of 12 knots.
- Personnel riding in the man-riding basket shall wear an acceptable safety harness secured to the handrail of the appliance.
- All working platforms (hydraulic, pneumatic and electric) shall comply with the specific standards, manufacturer manuals and this procedure.
- The following points shall be considered for SWL calculation of working platform.
- Average personnel weight shall be 100 kgs.
- Average working tools weight shall be 25 kgs. per person
- Tare weight of the equipment.
- All working platforms shall be:
- Thoroughly inspected by an approved TPCA at a maximum interval of six months.
- PLT to 125% SWL after major alteration/repair and thereafter every four years.
- 100% SWL test yearly.

4.11 Lifts (Passenger and Cargo)

All lifts (passenger and cargo) shall comply with the requirements of the specified standards and the manufacturer operation and maintenance manuals, and in addition:

- All lifts (passenger and cargo) shall be fully inspected, function tested and witnessed by an approved TPCA at a maximum interval of six months.
- The number of persons permitted at one time inside the lift and SWL shall be prominently displayed on all lifts.
- Lifts (passenger and cargo) shall not be used beyond the statutory test period.
- All lifts (passenger and cargo) shall have a logbook in which the operator records the maintenance, safety checks and comments relating to the operation.

4.12 Winches

4.12.1 General Requirements

All winches, including air-driven winches, shall comply with the requirements of the specified standards, and in addition the following shall apply:

- Winch control shall be manned at all times while the winch is in use.
- All winches shall be thoroughly inspected by an approved TPCA at a maximum interval of six months.
- No winch shall be used beyond its statutory test period.
- All winches shall have a maintenance logbook.
- The wire rope size shall never exceed the manufacturer‘s recommended size.
- All winches used in marine, offshore and onshore environments shall be tested to 100% SWL. The applied load and % of maximum pull per line tested shall be clearly specified in the winch certificate and thorough examination and PLT certificates.
- All winches shall be fitted with safety guard to protect the operator.
- All winches shall be marked with SWL.

4.12.2 Winches for Man-Riding Basket

In addition to requirements of 5.18.1 above, all man-riding winches:

- Shall be fitted with a high tensile strength steel wire rope of a capacity of 10 x SWL of the winch.
- Shall have a rope spooling device.
- Shall have a manual hand brake in addition to an automatic brake system.
- Shall be fitted with an emergency stop device.
- Shall be constructed so that the brake mechanism is permanently applied at all times when the operating controls are in the neutral position.
- Shall be fitted with upper and lower travel limit switches, in addition to an overload protection.
- Shall not be fitted with a free fall mechanism
- Shall be clearly marked ‘MAN-RIDING ONLY ‘with SWL.
- Shall be used only with a certified man basket for all personnel lifting operations.
- Each person riding in the man-riding basket shall have a safety line secured to the hoist hook.
- The winch wire rope shall be replaced every four years, irrespective of the condition of the rope.

4.13 Runway Beam

- Runway Beam shall be PLT on initial installation before being put into use, after reinstallation at the site, and at the discretion of the surveyor.

- The visual and thorough examination shall be carried out at six month intervals.
- Following thorough and visual examination and if defects are evident, the TPCA may instruct to carry out further tests, examinations.

4.14 Vehicle Mounted Drilling Rig

- All operating levers/switches/gauges shall be identified and operable. Operator shall be safely protected at the operating panel area.
- Emergency stops to be fitted within operator‘s reach.
- The ground condition shall be assessed before deploying the outriggers which shall be marked with red and white chevron patters.
- The load bearing components, the mast structure, the drilling lifting capacity and the auxiliary single joint lifting equipment shall be PLT and inspected by an approved TPCA.
- SWL shall be marked on the drilling mast and on the single joint lifting winch.
- All hoses and connections shall be pressure rated, safely routed and secured.

4.15 Lifting Tackles

All lifting tackle shall be clearly marked, die-stamped or tagged as appropriate with a unique identification number and it‘s SWL. All items shall be colour coded in accordance with QS colour coding scheme applicable at the time of utilization, in addition to the classification society requirements shall also require certification in line with this regulation, i.e. the inspection interval for these cranes shall include a six monthly thorough inspection.
All lifting tackle shall be:

- Thoroughly inspected by an approved TPCA at a maximum of six monthly intervals.
- Thoroughly inspected and tested to 100% SWL if the six monthly inspections were missed.
- Thoroughly inspected and PLT if a one year inspection and more were missed.

The following lifting tackle shall be examined and tested;

- **Beam Clamp**

- Shall be inspected and PLT.
- And shall be free from any deformation, permanent elongation, visible cracks and any evident wear at pins, bolts, threads, pivots, or other moving parts.

Note: Any fabricated clamp without design calculation shall be PLT to three x SWL.

- **Bundle Puller**

Be inspected and PLT and be free from any deformation, particularly on the lifting point.

Note: Single lifting point bundle puller shall be subjected for approval of HSE.

- **Cargo Basket, Skip, Container, Cylinder Rack and Lifting Frame**

All cargo baskets, skips, containers, cylinder racks and lifting frames used for transportation of materials, equipment or plant shall be designed, constructed, operated and maintained in accordance with the applicable standards and this procedure. In addition the following shall apply:

- Be inspected and PLT.
- Protruding parts such as door handles, hinges, hatch cleats etc. shall be so placed or so protected that they do not catch the lifting set or other structures.
- Provided with pad eyes designed for a total vertical force of three times the gross weight of the container.
- Area for colour coding shall be clearly identified.

- **Chain Sling**

In addition to the relevant standard the following shall apply:

- Each new chain sling shall be thoroughly examined and PLT.
  In service chain sling shall be examined thoroughly and as far as is reasonably practicable from any of the following;
- Chain sling markings (i.e. identification and/or the working load limit)
  Unknown chain sling shall remove from service or shall be certified provided that the chain link and all terminal fittings are known or identifiable.

- **Hooks**

All hooks shall be subjected to PLT by any approved TPCA before being put to service.
The hook shall also be verified with the following;

- Bending and twisting of more than 10 degrees from the plane of the unbent hook.
- Increase of throat opening by more than 15%.
- Any wear exceeding 10% of the original section of the hook or its load pin.
- Any crack, nicks or gouges.
- Inoperative latch (if provided).
- Hooks found to be in any of the above condition shall be removed from its service until repaired or replaced.

- **Hopper**

Hoppers shall be constructed having four corners each having a lifting point. The four lifting points shall withstand the PLT of 2.5 x gross weight without sign of any deformation or defects.

- **Jumbo Bags**

All jumbo bags complete with lifting straps shall be rated for the content weight.

- Jumbo bags shall not be reused or re-circulated.
- Jumbo bags shall have four lifting points from lifting straps that are completely encircling the bag.
- Jumbo bags shall be lifted by using a four leg sling. Bag shall not be lifted by a single leg sling or a single loop.
- Jumbo bags shall be inspected before transporting/lifting to ensure that it is in good condition. Any bag showing signs of damage or distortion shall not be used.
- Jumbo Bags shall be protected from sunlight and moisture at storage areas.
- Jumbo Bags shall not be dragged or lifted by sharp edges.
- Jumbo Bag manufacturer‘s safe handling and stacking instructions shall always be followed..
- Jumbo Bags shall be certified as per the relevant standard.
- A batch testing procedure as detailed underneath shall be followed for certification of the bags.
- One bag marked with an ID number, from a lot shall be break load tested.
- The bag shall be filled with material to its capacity and the test load shall be suspended using two 5 tonnes webbing slings wrapped over the bag.
- Actual breaking load shall be recorded using a calibrated load cell.
- The break test certificate number shall be referred on the certificate issued for the remaining bags (with unique ID nos.).
- The details such as ID no., SWL, Break test certificate no., class of use (single trip only) shall be marked on each bag.

- **Safety Harness/Fall Arrestor**

The inspection criteria shall be as follows:

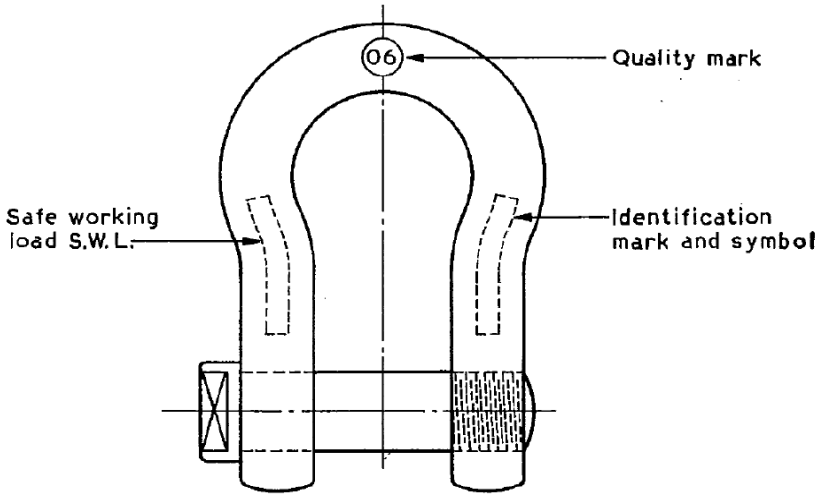
- Six monthly visual inspections shall be carried out by an approved TPCAs.
- Examine the ‘Saflok ‘top hook and check for any distortion or wear and ensure the safety latch engages correctly.
- Examine the top shackle and check for distortion or wear between shackle pin and body.
- Examine complete body casting and check for cracks/impact damage that may affect the workings of the block.
- If the block is the retrieval type, ensure the winding handle is still attached.
- Pull out the cable and check for broken wires, wear and corrosion. Pay particular attention to the portion of wire below the neoprene buffers, as this tends to be a moisture trap.

- Examine the thimble eye in wire and swivel eye in hook and check for any wear or distortion.
- Examine bottom hook and check for any wear or distortion and ensure safety latch engages correctly.
- Examine the webbing on the safety harness and check for any wear or cuts.
- Ensure all stitching is intact and metal fittings have not abraded the webbing.
- Examine the buckles/clasp etc. for any visual damage and ensure it fastens correctly.
- TPCA and manufacturer‘s issued certificate of conformity or test certificates shall be submitted for HSE review and acceptance.
- Fall arrestors to be listed for verification to HSE.
- Department Safety representative to check the safety harness and fall arrestors prior to use.
- Safety harness shall be discarded after four years regardless of condition.
- Note: It is a mandatory requirement to use the full body harness with shock absorbing double lanyard and snap hooks in QS operational areas.

➢ **Shackle**

- Shackles with the capacity of less than two tonnes shall not be used for lifting within QS operational area.
- All shackles shall be individually inspected and PLT
- In addition all shackles shall be inspected for:
- Body bend, nick, crack and wear.
- Pin for any wear, crack, nick and deformation.
- Pin hole alignment,
- Pin sits and fits correctly

- Markings as below:



- Unknown or unidentified shackles shall not be certified and utilized in QS.

- **Spreader Beam/Lifting Beam/Lifting Bar**

  - Spreader beam, lifting beam or lifting bar shall be examined and tested.
  - All spreader beam or lifting beam shall be PLT every four years.

- **Webbing Sling (Flat Woven/Man-Made Fibre)**

  - All webbing slings shall be supplied with an approved TPCA certificate of a break test.
  - Also shall be fitted with a label (laminated type) that gives the following minimum information:
  - SWL and distinguishing mark(s).
  - The material used to manufacture the sling.
  - Name or unambiguous trade mark of the manufacturer.
  - Mode factors for choke hitch, basket hitch with legs parallel and basket hitch with legs at 0-45 degrees.
  - Webbing slings shall not be colour coded with enamel or spray paint directly. Attach a label or circular disk to indicate the current colour coding system.
  - Webbing sling can only be used for a maximum four (4) years within QS operational area from the initial use.

- **Wire Rope**

  - All wire rope shall be supplied with an approved TPCA certificate of a break test.
  - Wire rope to be installed in any lifting appliances shall be accepted by Lifting Supervisor.
  - All wire rope shall comply with the following requirements:

- **Wire rope must have a certificate that will give at least the following information:**

  - Certificate number,
  - Name and address of the manufacturer,
  - Quantity and nominal length of rope,
  - Standard to which the rope conforms,
  - Minimum breaking force,
  - Date of issue of the certificate and authentication,
  - Measured diameter of rope,
  - Measured breaking force of rope.

4.16 Wire Rope Inspection

All wire rope in continuous service should be checked daily during normal operation and inspected on a weekly basis. A complete and thorough inspection of all ropes in use must be made at least once a month. Rope idle for a month or more should be given a thorough inspection before it is returned to service. A record of each rope should include date of installation, size, construction, length, extent of service and any defects found.

Conditions such as the following should be looked for during inspection.

- **Broken Wires**

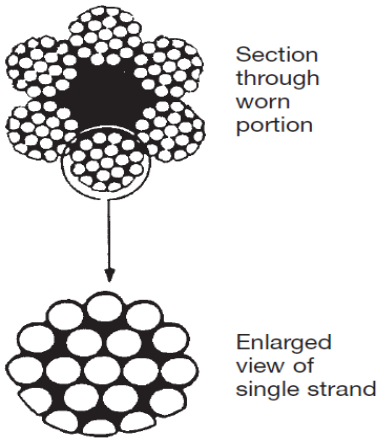
Occasional wire breaks are normal for most ropes and are not critical provided they are at well-spaced intervals. Note the area and watch carefully for any further wire breaks. Broken wire ends should be removed as soon as possible by bending the broken ends back and forth with a pair of pliers. This way broken ends will be left tucked between the strands.

- **Worn and Abraded Wires**

Abrasive wear causes the outer wires to become "D" shaped. These worn areas are often shiny in appearance. The rope must be replaced if wear exceeds 1/3 of the diameter of the wires.

- **Reduction in Rope Diameter**

Reduction in rope diameter can be caused by abrasion of outside wires, crushing of the core, inner wire failure, or a loosening of the rope lay. All new ropes stretch slightly and decrease in diameter after being used.



When the surface wires are worn by 1/3 or more of their diameter, the rope must be replaced.

- **Rope Stretch**

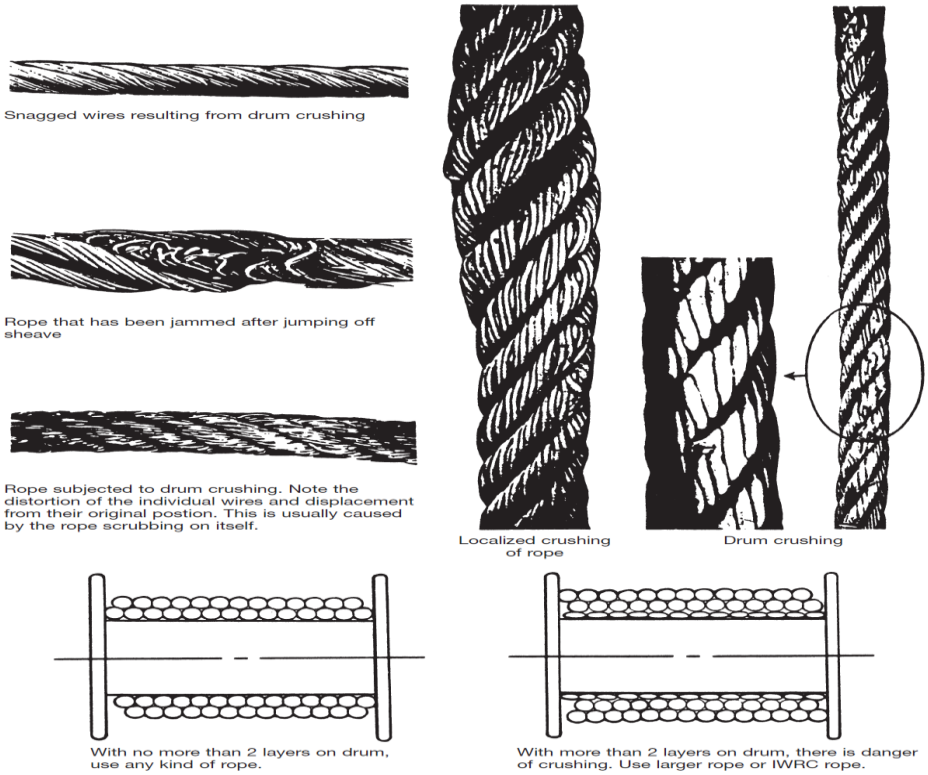
All steel ropes will stretch during initial periods of use. Called “constructional stretch”, this condition is permanent. It results when wires in the strands and strands in the rope seat themselves under load. Rope stretch can be recognized by increased lay length. Six-strand ropes will stretch about six inches per 100 feet of rope while eight-strand ropes stretch approximately 10 inches per 100 feet. Rope stretched by more than this amount must be replaced.

- **Corrosion**

Corrosion is a very dangerous condition because it can develop inside the rope without being seen. Internal rusting will accelerate wear due to increased abrasion as wires rub against one another. When pitting is observed, consider replacing the rope. Noticeable rusting and broken wires near attachments are also causes for replacement. Corrosion can be minimized by keeping the rope well lubricated.

- **Crushed, Flattened or Jammed Strands**

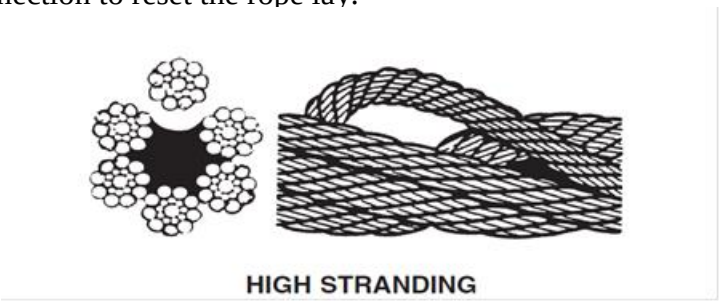
These dangerous conditions require that the rope be replaced. They are often the result of crushing on the drum.



CRUSHED, JAMMED AND FLATTENED STRANDS

- **High Stranding and Un-laying**

These conditions will cause the other strands to become overloaded. Replace the rope or renew the end connection to reset the rope lay.



HIGH STRANDING

- **Bird Caging**

Bird caging is caused by the rope being twisted or by a sudden release of an overload. The rope, or the affected section, must be replaced.

Multi-strand rope "birdcages" because of torsional unbalance.
Typical of buildup seen at anchorage end of multi-fall crane application.

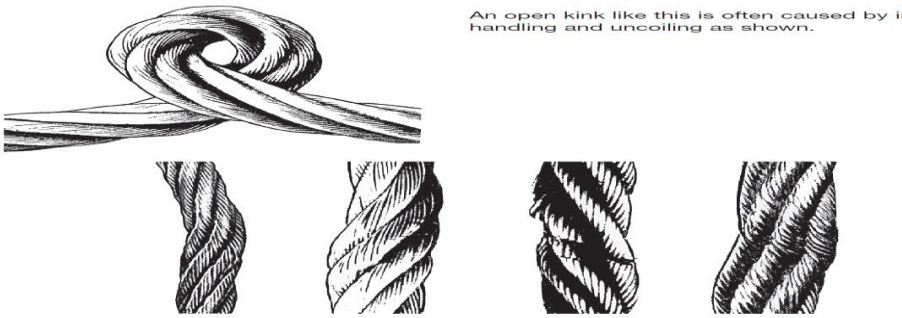
A birdcage caused by sudden release of tension
and resulting rebound of rope from overloaded condition.
These strands and wires will **not** return to their original positions.

A birdcage which has been forced through a tight sheave.

BIRD CAGING

- **Kinks**

Kinking is caused by loops that have been drawn too tightly as a result of improper handling. Kinks are permanent and will require that the rope, or damaged section, be taken out of service.

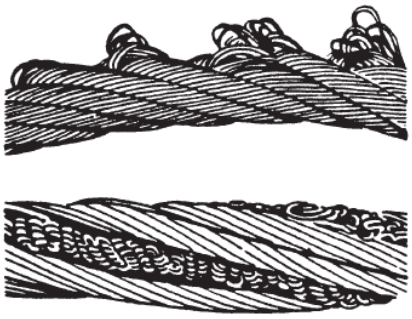


These ropes show the severe damage resulting from the use of kinked ropes. Local wear, distortion, misplaced wires, and early failure are inevitable.

ROPE KINKS

- **Core Protrusion**

Core protrusion can be caused by shock loads and/or torsional imbalance. This condition requires that the rope be taken out of service.



CORE PROTRUSION

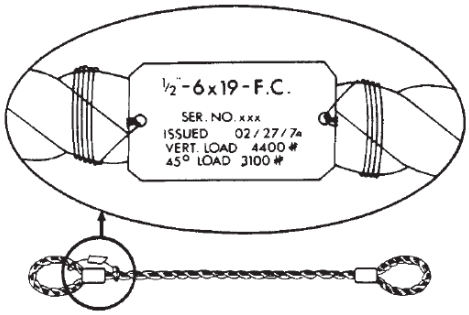
- **Electrical Contact**

Rope subjected to electrical contact will have wires that are fused, discolored or annealed and must be removed from service.

4.17 Wire Rope Sling

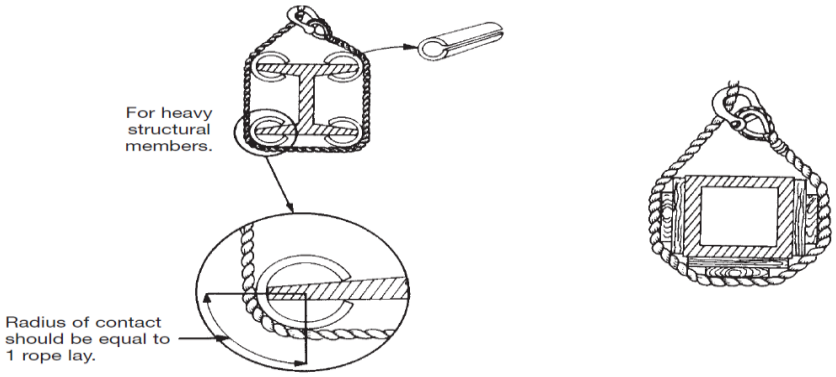
- All wire rope slings shall be supplied with an approved TPCA certificate of a break test.
- Each wire rope sling shall be examined and PLT.

- Certificate of multi-leg wire rope sling shall provide detail of master link and other terminal fittings for verification. Without this detail, the certificate will not be endorsed.
- Never use damaged slings. Inspect slings regularly to ensure their safety. Check wire rope slings for kinking, wear, abrasion, broken wires, worn or cracked fittings, loose seizing and splices, crushing, flattening, and rust or corrosion. Pay special attention to the areas around thimbles and other fittings.
- Slings should be marked with an identification number and their maximum capacity on a flat ferrule or permanently attached ring. Mark the capacity of the sling for a vertical load or at an angle of 45°. Ensure that everyone is aware of how the rating system works.

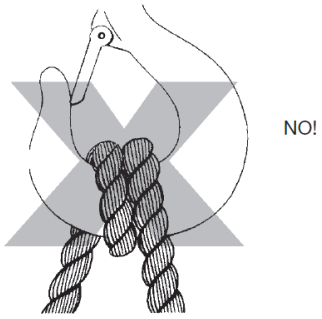


- Avoid sharp bends, pinching, and crushing. Use loops and thimbles at all times. Corner pads that prevent the sling from being sharply bent or cut can be made from split sections of large diameter pipe, corner saddles, padding, or blocking.

Ensure that Slings are Protected at All Sharp Corners on Heavy Items

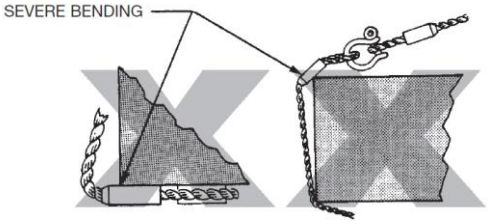


- Never allow wire rope slings, or any wire rope, to lie on the ground for long periods of time or on damp or wet surfaces, rusty steel, or near corrosive substances.
- Avoid dragging slings out from underneath loads.
- Keep wire rope slings away from flame cutting and electric welding.
- Never make slings from discarded hoist rope.
- Avoid using single-leg wire rope slings with hand-spliced eyes. The load can spin, causing the rope to un-lay and the splice to pull out. Use slings with Flemish Spliced Eyes.



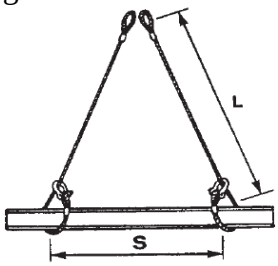
Never Wrap a Sling Around a Hook

- Never wrap a wire sling completely around a hook. The sharp radius will damage the sling. Use the eye.



Do Not Permit Bending Near Any Splice or Attached Fitting

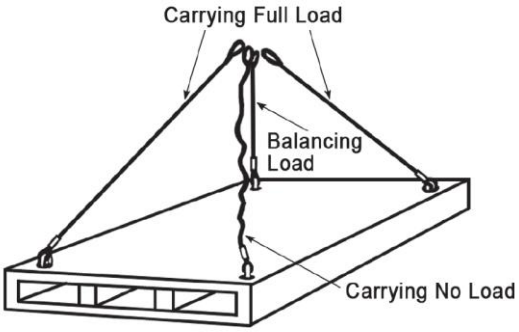
- Avoid bending the eye section of wire rope slings around corners. The bend will weaken the splice or swaging. There must be no bending near any attached fitting.



If L is greater than S then sling angle is OK.

Check on Sling Angle

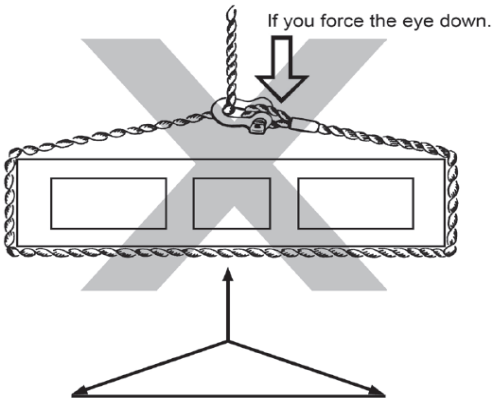
- Ensure that the sling angle is always greater than 45° and preferably greater than 60°. When the horizontal distance between the attachment points on the load is less than the length of the shortest sling leg, then the angle is greater than 60° and generally safe.
- Multi-leg slings - With slings having more than two legs and a rigid load, it is possible for some of the legs to take practically the full load while the others merely balance it. There is no way of knowing that each leg is carrying its fair share of the load.



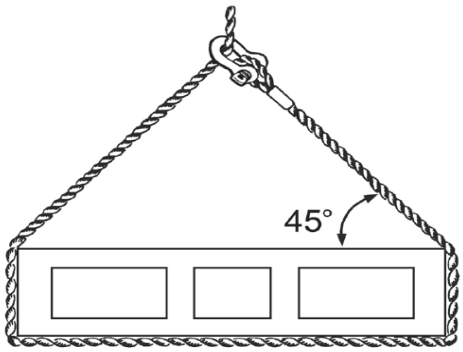
- As a result, when lifting rigid objects with three- or four-leg bridle slings, make sure that at least two of the legs alone can support the total load. In other words, consider multi-leg slings used on a rigid load as having only two legs.

- When using multi-leg slings to lift loads in which one end is much heavier than the other (i.e., some legs simply provide balance), the tension on the most heavily loaded leg(s) is more important than the tension on the more lightly loaded legs. In these situations, slings are selected to support the most heavily loaded leg(s). Do not treat each leg as equally loaded (i.e., do not divide the total weight by the number of legs.) Keep in mind that the motion of the load during hoisting and travel can cause the weight to shift into different legs. This will result in increases and decreases on the load of any leg.

- When using choker hitches, forcing the eye down towards the load increases tension in the sling, which can result in rope damage. Use thimbles and shackles to reduce friction on the running line.



Low sling angles create severe loading on the sling.



Let the eye ride higher and keep this angle approx. 45° or more.

Incorrect – Cutting action of eye splice on running line.

Correct – Use thimbles in the eyes.

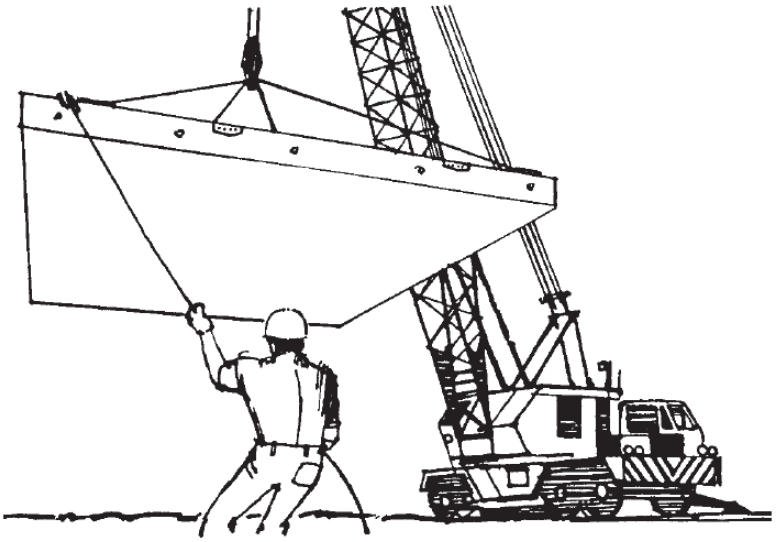
Incorrect – Shackle pin bearing on running line can work loose.

Correct – Shackle pin cannot turn.

- Whenever two or more rope eyes must be placed over a hook, install a shackle on the hook with the shackle pin resting in the hook and attach the rope eyes to the shackle. This will prevent the spread of the sling legs from opening up the hook and prevent the eyes from damaging each other under load.

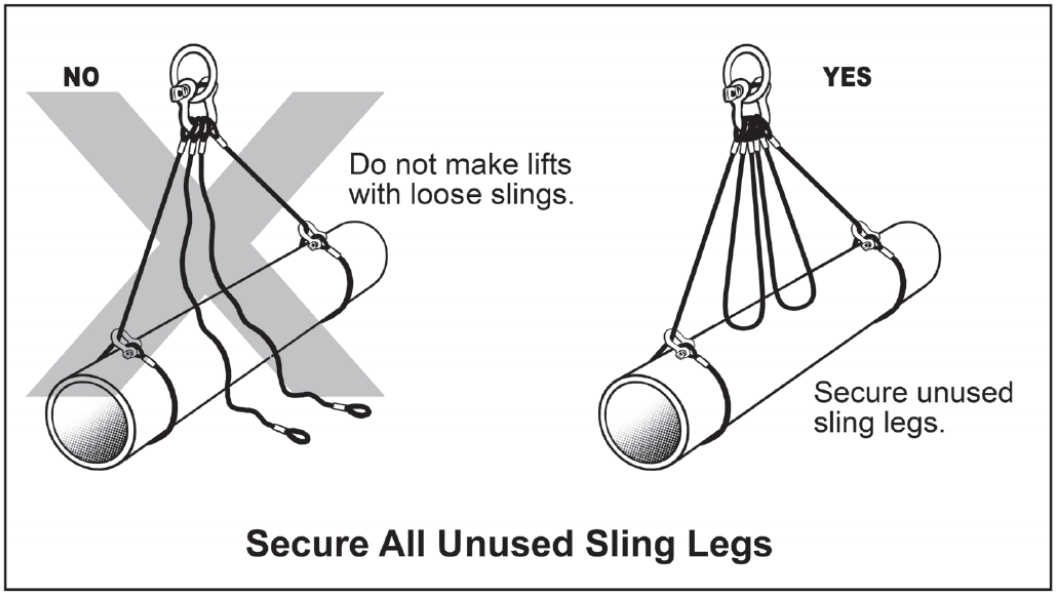
Whenever 2 or more ropes are to be Placed Over a Hook – Use a Shackle

- Rig loads to prevent any parts from shifting or dislodging during the lift. Suspended loads should be securely slung and properly balanced before they are set in motion.
- Keep the load under control at all times. Use one or more taglines to prevent uncontrolled motion.



Use Tag Lines to Control All Loads

- Loads must be safely landed and properly blocked before being unhooked and unslung.
- Lifting beams should be plainly marked with their weight and designed working loads, and should only be used for their intended purpose.
- Never wrap the hoist rope around the load. Attach the load to only the hook, with slings or other rigging devices.
- The load line should be brought over the load's center of gravity before the lift is started.
- Keep hands away from pinch points as slack is being taken up.
- Wear gloves when handling wire rope.
- Make sure that everyone stands clear when loads are being lifted, lowered, and freed of slings.
- As slings are being withdrawn, they may catch under the load and suddenly fly loose.
- Before making a lift, check to see that the sling is properly attached to the load.
- Never work under a suspended load.
- Never make temporary repairs to a sling. Procedures for proper repair should be established and followed.
- Secure or remove unused sling legs of a multi-leg sling before the load is lifted.



- Never point-load a hook unless it is designed and rated for such use.
- Begin a lift by raising the load slightly to make sure that the load is free and that all sling legs are taking the load.
- Avoid impact loading caused by sudden jerking during lifting and lowering. Take up slack on the sling gradually. Avoid lifting or swinging the load over workers below.
- When using two or more slings on a load, ensure that they are all made from the same material.
- Prepare adequate blocking before loads are lowered. Blocking can help prevent damage to slings.

4.18 Control of General and Critical Lifting Operations

4.18.1 General Lifting Operations

All lifting operations shall be carried out by competent persons using the appropriate equipment in a safe manner taking into consideration all of the following requirements:

- Details of the lift, location and associated risk,
- Planned, considering the equipment and manpower certification requirements,
- A risk assessment is completed,
- A toolbox talk is completed,
- Execute with approved and certified personnel and equipment.

4.18.2 Risk Assessment

A risk assessment, specific to the site and lift, shall be carried out by a competent person to identify all potential risks associated with the lifting operation. The competent person shall determine the nature and extent of any measures required to mitigate risk.
A contingency plan and escape route to mitigate any eventuality shall be in place.
The risk assessment shall be documented and reviewed by the HSE.

4.18.3 Critical Lift

This section specifies the minimum requirements for the execution of critical lifts.
Lifting operations are classified as critical if any one of the following conditions applies:

- Any load dimension exceeds 12 meters or the load is of a complex shape where is difficult to determine.
- Lifts that exceed 50 tons in weight.
- Lifts which exceed 30 meters in height.
- Lifts which require full boom extension or maximum radius.
- Lifts requiring use of more than one crane simultaneously.
- Lifts where the equipment/load consists of thin/fragile members susceptible to deformation during lifting.
- Personnel lifts, lifts over pipelines, near overhead electric power lines, where lifting operation can endanger the safety of the plant or crane.
- Lifts where safety of personnel and equipment are at risk, which is a concern raised by any responsible authorities.

4.18.4 Critical Lifting Plan/Method Statement

A lifting plan/method statement, JSA, including all TP Certificates, shall be submitted to QS HSE for acceptance prior to undertaking the operation, at least seven working days in advance and shall cover the following as a minimum:

- The plan shall address all the foreseeable risks and identify the procedures, responsibilities and any resources required, so that the lifting operation is carried out safely and logically.
- A sketch, including plan and elevation, shall be prepared to scale, detailing the sequence of operation. This shall also show the layout of the equipment/load to be lifted, positioning of the crane/s and load, before, during and after the lift, attaching the lifting gears and tag lines, etc.
- The sequence of the operation to include site preparation, arrival of the equipment on site, any necessary erection, positioning of the crane, lifting and placing of the load(s), and dismantling the crane(s) after lift, to moving off site.
- Crane and lifting gear with a capacity of 25% above the maximum estimated weight

of the load to be handled at as-rigged configuration shall be selected for the lift.

- Relevant calculations supporting the safety limits of operation shall consider the effects of dynamic loading and weather conditions. The estimation of the load shall include the weight of hook block, weight of all lifting gear and the weight of the wire rope below boom tip.
- When a load is to be lifted using the main hook, whilst the fly jib is installed, the weight of the fly jib and the fly hook shall be removed from the lifting capacity of the main hook.
- The crane configuration such as boom length, height of lift, radius, and available capacity for the intended lift and actual load to be handled at that configuration shall be clearly stated on the plan. The FOS to be calculated and stated on the plan.
- The plan shall ensure that there is adequate site access for safe operation of the lifting equipment. Consideration shall be given to safe positioning of the outriggers or crawlers.
- The compactness of the ground or foundations shall be assessed such that the crane can operate within level at all times. The bearing pressure shall be calculated taking into account the dead weight of the crane, weight of the load, and any other dynamic factors and shall not exceed the bearing capacity of the supporting ground or foundations.
- The crane and associated lifting gear shall have valid certificates available.
- All the lifting personnel such as rigging supervisor, riggers and the crane operator shall have valid certificates available.
- A clear copy of the crane capacity chart (in metric units and English language) shall be available.
- All lifting operations involving the lifting of personnel shall be subject to a preapproved
- Standard operating procedure (method statement), endorsed by Corporate HSE, taking all risks into consideration. This SOP shall be attached to the PTW prior to any lift.

4.18.5 Responsibilities for Critical Lift

- A competent person, having adequate practical, theoretical knowledge, experience of planning in lifting operations must plan the lifting operation.
- The plan shall nominate a person in charge of the lifting operation. Clear identification and assignment of the responsibilities, including name, for all the activities shall be stated in the plan.
- A ‘Lifting Team‘, comprising site engineer/job officer, rigging supervisor, crane operator, rigger and a department safety representative, are essential for the operation. The nominated person in charge of the lifting operation must make the decisions for the critical lift operation ensuring that the lifting operation is carried out to the approved plan.
- The plan shall ensure provision of suitably trained and certified crane operator, rigging supervisor and riggers who are aware of their duties and responsibilities.

- The nominated person in charge of the lifting operation shall conduct a 'Tool box talk' prior to the lifting operation briefing all the persons involved.
- Suitable means of communication shall be established for the lifting operation.

4.18.6 Generic Plan

To assist QS operational areas in conducting critical lifts using a single crane to carry out routine day to day maintenance activities the following additional requirements:

- **Single Mobile Crane Operation**

  - Valid for single continuous lifting operation.
  - Lifts of five tones or less.
  - Maximum boom length of 30 meters.
  - Operating within 80% of the crane rated capacity with the specified crane configuration.

Form can be used for this lifting plan.
Generic lifting plans shall be approved by a QS rigging supervisor or a critical lift plan will have to be prepared and submitted for HSE review and acceptance.

- **Fixed Crane Operation**

Lifting plans shall be developed for each crane location covering all foreseeable lifts to be performed. These lifting plans shall be submitted for HSE one-off acceptance.

4.19 Inspection Frequencies

- All lifting equipment shall be fully inspected and certified by an approved TPCA before being put into service, and at all subsequent periodic inspections.
- For all lifting appliances the first and all subsequent inspections shall include all functional tests, overload and safety tests.
- Periodic inspection of lifting equipment shall also include the following:
  - A thorough inspection of all components.
  - All lifting connections, attachments and structural components, as necessary.
- In the event of a major repair, the periodic inspection shall include a thorough inspection of all internal parts and components after dismantling, and is to be complimented by a PLT.
- The subsequent lifting tackle frequency of inspection shall be six (6) months in every case.
- All subsequent periodic inspections shall include a thorough visual examination that will be complemented by a PLT when repairs or modifications have been conducted. These shall be witnessed and certified by an approved TPCA.

- All lifting tackle shall be subjected to inspection by a competent rigger, each and every time it is used. Where, in the opinion of the rigger, it is unsafe for use that item will be immediately removed from the worksite.
- All lifting appliances shall be inspected and function tested by a competent operator for correct functioning (special attention shall be paid to safety systems) at intervals not exceeding seven (7) days. Where the lifting appliance is subject to infrequent use, it shall be inspected and function tested by a competent operator before each occasion on which it is used.

4.20 Storage and Handling of ropes

- The ropes must be stored above the ground or floor to prevent sweating or corrosion.
- They should be kept under cover in dry conditions away from corrosive agents like acid fumes etc.
- Wire rope requires lubrication externally to help resist abrasion and corrosion and internally to aid relative movement of wires as ropes bend.
- A splice is one of the most important parts of a sling and to ensure against any failure it is essential that an appropriate splice is used.

4.21 Inspection and norms for discarding ropes

- If any ten wires came out from any strand of wire ropes it should be discarded.
- When the diameter of standard rope is reduced by more than 10%, it should be discarded.
- Corrosion can be infinitely more dangerous than wear as usually wires are affected.
- Free from dust, and examine individual wires. Discard where corrosion is not purely superficial.
- Crushed or jammed strands are dangerous and should not be used.
- No unauthorized splicing or any modification on wire ropes is allowed.

- **4.22 Job authorization matrix according to Wind Speed**

قطر ستيل
QATAR STEEL

Job authorization matrix according with wind speed.

WIND SPEED Km/h / ACTIVITY	0 - 20	21 - 30	31 - 40	41 - 50	51 - 60	61 - 70	>70
Cage Maneouvres with people and cranes	C	⊘	⊘	⊘	⊘	⊘	⊘
Critical Hoistings	👍	C	⊘	⊘	⊘	⊘	⊘
Elevation Platforms	👍	C	⊘	⊘	⊘	⊘	⊘
Non Critical Hoisting	👍	👍	C	⊘	⊘	⊘	⊘
Roof Jobs	👍	👍	C	⊘	⊘	⊘	⊘
Fix mast type Elevator Platforms	👍	👍	👍	C	C	⊘	⊘
Ground level Jobs	👍	👍	👍	👍	C	C	C

👍 - Job performance with no risk.

⊘ - Job Forbidden .

C - Jobs should be authorized by approved lifting supervisor according with specific procedures and preventive measures.

4.23Appendices:
Rigging Plan Form – COE/HSE/SE/F074-01